1. Identification Information
1.1 Citation
8. Citation Information
8.1 Originator: Belle W. Baruch Institute for Marine Biology and Coastal Research
8.1 Originator: North Inlet – Winyah Bay National Estuarine Research Reserve (NIW NERR)
8.1 Originator: Belle W. Baruch Institute of Coastal Ecology and Forest Science
8.2 Publication Date: 200301
8.4 Title: Long-Term Rainfall Monitoring Database (RAINDAZE) for Hobcaw Barony and the North Inlet Estuary, Georgetown, South Carolina: 1978 – 2001.
8.5 Edition: First Edition
8.6 Geospatial Data Presentation Form: comma delimited digital data and spreadsheet
8.7 Series Information
8.7.1 Series Name: Baruch Institute's Meteorological Database for the North Inlet Estuary, South Carolina
8.7.2 Issue Identification: April 1, 1978 – December 31, 2001
8.8 Publication Information:
8.8.1 Publication Place: Belle W. Baruch Marine Field Laboratory, Georgetown, South Carolina, USA
8.8.2 Publisher: The Belle W. Baruch Institute for Marine Biology and Coastal Research, Baruch Marine Field Lab, University of South Carolina
8.9 Other Citation Details: The 1997 through 2001 data were collected under the auspices and protocols of the National Estuarine Research Reserve's (NERR's) System-Wide Monitoring Program (SWMP), but the data are not considered official SWMP data until the year 2000. This metadata document was produced by Baruch's Data Managers, and is independent of the NERR/CDMO version of the data and metadata.
8.10 Online linkage: http://links.baruch.sc.edu/data/
8.11 Larger Work Citation
8. Citation Information
8.1 Originator: W.K. Michener (Editor)
8.1 Originator: A.B. Miller (Editor)
8.1 Originator: R. Nottrott (Editor)
8.2 Publication Date: 1990
8.4 Title: Long-Term Ecological Research Network Core Data Set Catalog
8.6 Geospatial Data Presentation Form: catalog in book and on-line form
8.8 Publication Information:
8.8.1 Publication Place: Columbia, South Carolina, USA
8.8.2 Publisher: The Belle W. Baruch Institute for Marine Biology and Coastal Research, University of South Carolina
8.9 Other Citation Details: Published for the Long-Term Ecological Research Network

1.2 Description:
1.2.1 Abstract:

The RAINDAZE database is a compilation of rain data from multiple rain gauges on Hobcaw Barony for the period of April 1, 1978 through December 31, 2001. Data collection protocols and procedures vary throughout the database because multiple rain gauges were used. However, the primary rain gauges utilized in this database were both located at Oyster Landing on Crab Haul Creek, near the University of South Carolina's Baruch Marine Field Lab. Prior to July of 1997, the primary gauge was LTER gauge R8 and other gauges on the property were simply used to supplement the R8 data when the gauge was inoperative (See Supplemental Information Section). In July of 1997 the North Inlet – Winyah Bay NERR Weather Station's rain gauge became the primary rain gauge for the database. RAINDAZE data are reported by "day-event" (24-hour period including a rain event) or by "event" (whatever length of time the rain event lasted, may be fewer or more than 24-hours) in both inches and millimeters. Start and end dates and times for the rainfall events or 24-hour day-event periods are provided. Data collection continues into the year 2003 as part of the North Inlet Weather Monitoring Program.

1.2.2 Purpose:

The principal objective of this dataset is to monitor and archive rain data for Hobcaw Barony and the North Inlet Estuary in order to observe environmental variability, changes, or trends over time, and for use in short and long-term studies at North Inlet and other nearby estuaries. The National Oceanographic and Atmospheric Administrations' (NOAA) National Estuarine Research Reserve System (NERRS) implemented the NERR System-wide Monitoring Program (SWMP) in order "to identify and track short-term variability and long-term changes in the integrity and biodiversity of representative estuarine ecosystems and coastal watersheds for the purpose of contributing to effective

national, regional, and site specific coastal zone management." As part of the NERR System-wide monitoring program, the rain data collected by the NERR weather station (and included in the RAINDAZE database) will contribute to that goal, in addition to providing a valuable comparison to other NERR sites.

1.2.3 Supplemental Information:

Hobcaw Barony is a privately owned research preserve, dedicated to teaching and research in forestry, wildlife biology, and marine science. The 17,500 acre preserve, originally 10 individual rice plantations purchased by Bernard Baruch from 1905-1907, is composed of approximately 30 percent wooded upland and 70 percent tidal salt marsh (North Inlet Estuary). It is maintained and managed by the Belle W. Baruch Foundation, a non-profit organization created by Belle W. Baruch, Bernard's daughter. Two research field laboratories, Clemson University's Belle W. Baruch Institute of Coastal Ecology and Forest Science and the University of South Carolina's Belle W. Baruch Institute for Marine Biology and Coastal Research, are located on the premises. In 1978, the two field laboratories initiated a joint research project involving eight rain gauges located throughout the property (see digital aerial photograph on the web site page, "RAINDAZE.GAUGES.jpg"). This project fell under a broader undertaking, the Long-Term Ecological Research (LTER) project, funded by the National Science Foundation. One of the eight gauges from this project, gauge R8, became the primary rain gauge for the RAINDAZE database. The other seven gauges were used to supplement the data from R8 as necessary. In 1981, a National Weather Service (then the US Weather Bureau) rain gauge was moved on to the property and located at the airstrip hanger. This rain gauge was maintained and read by Foundation employees until 1989, when it was moved to the newly built Clemson facility (located near HWY 17) and became the responsibility of Clemson employees. In 1986, the University of South Carolina purchased a similar rain gauge, with National Weather Service support, and began collecting rain data as well. This gauge was located in a grass clearing near the Oyster Landing research site, which is on a tidal marsh creek called Crab Haul Creek. Both of these NWS gauges were also used to supplement the RAINDAZE database when there were problems with the primary rain gauge. The North Inlet Estuary and the adjacent lower northeastern section of Winyah Bay Estuary were designated as part of the National Estuarine Research Reserve System (NERRS) in 1992. The North Inlet - Winyah Bay (NIW) NERR's environmental monitoring program began collecting meteorological data (including rain) from Oyster Landing Pier (on Crab Haul Creek) in 1997. At this point, the NIW NERR weather station's rain gauge became the primary gauge for the RAINDAZE database.

Since this database was derived from several different rain gauge types and locations, the protocol for data collection differs throughout the database and within summary data. It is recommended that the user pay careful attention to the differences in data origin and their associated documentation. Please see the Methodology section for specific information on the protocols and processes used for each source and a complete schedule detailing when each source was used in the database. For ease of use, the rain gauges used in the RAINDAZE database will be referred to in the following manner:

The University of South Carolina's Belle W. Baruch Institute for Marine Biology and Coastal Research and Clemson University's Belle W. Baruch Institute of Coastal Ecology and Forest Science joint Long-Term Ecological Research Project Data: **LTER Gauges R1-R8**

Clemson University's Belle W. Baruch Institute of Coastal Ecology and Forest Science and Hobcaw Barony's - National Weather Service Data: **Clemson/Hobcaw NWS**

The University of South Carolina's Belle W. Baruch Institute for Marine Biology and Coastal Research – National Weather Service Data: **USC NWS**

The North Inlet - Winyah Bay National Estuarine Research Reserve's Weather Station, located at the University of South Carolina's Baruch Marine Field Laboratory: **NIW NERR**

Note: Daily, monthly, and yearly sums may be based on data that include missing data points. It is the user's responsibility to check the Missing Data Documentation in the Completeness Report portion of this document for missing data that may effect the time period they are interested in. However, if the Data Manager considered the missing data period to be "significant," the sum was either omitted or noted as including missing data points.

1.3 Time Period of Content:

9.3 Range of Dates/Times

9.3.1 Beginning Date:	19780401
9.3.3 Ending Date:	20011231

1.3.1 Currentness Reference
Ground Condition (USC NWS and Clemson/Hobcaw NWS rain gauges)
Observed (LTER Gauges R1-R8 and NIW NERR rain data)

1.4 Status:
1.4.1 Progress: Complete
1.4.2 Maintenance and update frequency: As needed

99.1.5.1 Description of Geographic Extent:
The Hobcaw Barony property is bordered to the north by the Debordieu Colony property, to the west by Highway 17, and is located in Georgetown County, South Carolina, USA. The North Inlet Estuary lies east of the uplands of Hobcaw Barony and contains Crab Haul Creek, where the Oyster Landing pier and research site are located. The rain gauges used and/or documented in this database are located at the following coordinates, listed in utm zone 17 North and in decimal degrees:

LTER Gauge R1:	3689857.10 N, 670346.08 E	-79.170 W, 33.334 N
LTER Gauge R2:	3692530.20 N, 665227.23 E	-79.224 W, 33.359 N
LTER Gauge R3:	3689788.33 N, 668175.91 E	-79.193 W, 33.334 N
LTER Gauge R5:	3689857.10 N, 666423.28 E	-79.212 W, 33.335 N
LTER Gauge R6:	3687650.29 N, 664390.40 E	-79.234 W, 33.315 N
LTER Gauge R7:	3686610.88 N, 666188.53 E	-79.215 W, 33.306 N
LTER Gauge R8:	3691595.60 N, 668314.63 E	-79.191 W, 33.350 N
USC NWS:	3691621.92 N, 668308.05 E	-79.191 W, 33.350 N
NIW NERR:	3691484.13 N, 668527.94 E	-79.189 W, 33.349 N
Clemson/Hobcaw NWS:	3690832.51 N, 663698.27 E	-79.241 W, 33.344 N
(at the Hanger location, 1981-1989)		
Clemson/Hobcaw NWS:	3692833.17 N, 665101.29 E	-79.225 W, 33.362 N
(at the Clemson field lab location, 1989-2001)		

1.5.1.1 West Bounding Coordinate: -79.270
1.5.1.2 East Bounding Coordinate: -79.153
1.5.1.3 North Bounding Coordinate: 33.366
1.5.1.4 South Bounding Coordinate: 33.296

1.6 Keywords
1.6.1 Theme

1.6.1.1 Theme Keyword Thesaurus:	None
1.6.1.2 Theme Keyword:	Weather
1.6.1.2 Theme Keyword:	Meteorological
1.6.1.2 Theme Keyword:	Climate
1.6.1.2 Theme Keyword:	Coastal
1.6.1.2 Theme Keyword:	Estuary
1.6.1.2 Theme Keyword:	Ecosystem
1.6.1.2 Theme Keyword:	Marsh
1.6.1.2 Theme Keyword:	Salt Marsh
1.6.1.2 Theme Keyword:	Tidal Creek
1.6.1.2 Theme Keyword:	NERR
1.6.1.2 Theme Keyword:	SWMP
1.6.1.2 Theme Keyword:	Rain
1.6.1.2 Theme Keyword:	Precipitation
1.6.1.2 Theme Keyword:	Long-Term
1.6.1.2 Theme Keyword:	Long-Term Ecological Research
1.6.1.2 Theme Keyword:	Atmosphere

1.6.2 Place

1.6.2.1 Place Keyword Thesaurus:	None
1.6.2.2 Place Keyword:	North Inlet

1.6.2.2 Place Keyword:	North Inlet Estuary
1.6.2.2 Place Keyword:	Hobcaw Barony
1.6.2.2 Place Keyword:	South Carolina
1.6.2.2 Place Keyword:	Atlantic Coast
1.6.2.2 Place Keyword:	Oyster Landing
1.6.2.2 Place Keyword:	Crab Haul Creek
1.6.2.2 Place Keyword:	East Coast
1.6.2.2 Place Keyword:	Southeast Coast
1.6.2.2 Place Keyword:	Coastal
1.6.2.2 Place Keyword:	Georgetown County
1.6.2.2 Place Keyword:	USA

1.6.4 Temporal

1.6.4.1 Temporal Keyword Thesaurus:	None
1.6.4.1 Temporal Keyword:	1978
1.6.4.1 Temporal Keyword:	1979
1.6.4.1 Temporal Keyword:	1980
1.6.4.2 Temporal Keyword:	1981
1.6.4.2 Temporal Keyword:	1982
1.6.4.2 Temporal Keyword:	1983
1.6.4.2 Temporal Keyword:	1984
1.6.4.2 Temporal Keyword:	1985
1.6.4.2 Temporal Keyword:	1986
1.6.4.2 Temporal Keyword:	1987
1.6.4.2 Temporal Keyword:	1988
1.6.4.2 Temporal Keyword:	1989
1.6.4.2 Temporal Keyword:	1990
1.6.4.2 Temporal Keyword:	1991
1.6.4.2 Temporal Keyword:	1992
1.6.4.2 Temporal Keyword:	1993
1.6.4.2 Temporal Keyword:	1994
1.6.4.2 Temporal Keyword:	1995
1.6.4.2 Temporal Keyword:	1996
1.6.4.2 Temporal Keyword:	1997
1.6.4.2 Temporal Keyword:	1998
1.6.4.2 Temporal Keyword:	1999
1.6.4.2 Temporal Keyword:	2000
1.6.4.2 Temporal Keyword:	2001
1.6.4.2 Temporal Keyword:	1970s
1.6.4.2 Temporal Keyword:	1980s
1.6.4.2 Temporal Keyword:	1990s
1.6.4.2 Temporal Keyword:	2000s
1.6.4.2 Temporal Keyword:	Half Hour
1.6.4.2 Temporal Keyword:	Hour
1.6.4.2 Temporal Keyword:	Day
1.6.4.2 Temporal Keyword:	Event
1.6.4.2 Temporal Keyword:	Week
1.6.4.2 Temporal Keyword:	Month
1.6.4.2 Temporal Keyword:	Year

1.7 Access Constraints:

None; however, it is strongly recommended that these data be directly acquired from the Belle W. Baruch Institute for Marine Biology and Coastal Research and not indirectly through other sources which may have changed the data in some way.

1.8 Use Constraints:

Following academic courtesy standards, the PIs (originators), the North Inlet – Winyah Bay NERR site, the University of South Carolina's Belle W. Baruch Institute for Marine Biology and Coastal Research, Clemson

> University's Belle W. Baruch Institute of Coastal Ecology and Forest Science, and Grantor (see Data Set Credit section) should be fully acknowledged in any subsequent publications in which any part of these data are used. Use of the data without completely reading and understanding the metadata is not recommended. The Baruch Institute, Baruch Institute researchers, and Grantor are not responsible for the use and/or misuse of data from this database. See the section on Distribution Liability for more information.

According to the Ocean and Coastal Resource Management Data Dissemination Policy for the NERRS System-wide Monitoring Program:

> NOAA/ERD retains the right to analyze, synthesize and publish summaries of the NERRS System-wide Monitoring Program data. The PI retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the PI and NERR site where the data were collected will be contacted and fully acknowledged in any subsequent publications in which any part of the data are used. Manuscripts resulting from the NOAA/OCRM supported research that are produced for publication in open literature, including refereed scientific journals, will acknowledge that the research was conducted under an award from the Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration.

1.9 Point of Contact:

10.2 Contact Organization Primary	
10.2.1 Contact Organization:	Univ. of South Carolina's Baruch Institute
10.2.2 Contact Person:	Ginger Ogburn-Matthews
10.3 Contact Position:	Research Data Manager & Analyst
10.4 Contact Address	
10.4.1 Address Type:	Mailing Address
10.4.2 Address:	USC Baruch Marine Field Laboratory
10.4.2 Address:	P.O. Box 1630
10.4.3 City:	Georgetown
10.4.4 State or Province:	South Carolina
10.4.5 Postal Code:	29442
10.4.6 Country:	USA
10.5 Contact Voice Telephone:	(843) 546 6219
10.7 Contact Facsimile Telephone:	(843) 546-1632
10.8 Contact Electronic Mail Address:	ginger@belle.baruch.sc.edu
10.9 Hours of Service:	8:30 am to 4:30 pm Mon.- Friday

1.11 Data Set Credit:

The National Science Foundation provided funding, under grants DEB 8012165 and BSR 8514326, to the North Inlet Long-Term Ecological Research (LTER) Program, Belle W. Baruch Institute, University of South Carolina, with Dr. F. J. Vernberg, as project director. Funding was provided to the NIW NERR by the National Oceanic & Atmospheric Administration (NOAA), through the Office of Ocean and Coastal Resource Management, Estuarine Reserves Division (initial award number NA270R0322-01 October 15, 1992). The University of South Carolina (USC), Clemson University, and the National Weather Service have also supported data collection. Numerous researchers, faculty, post-docs, technicians, students, and data managers have contributed to these datasets.

1.13 Native Data Set Environment:

LTER Gauges R1-R8:
The raw rain data were automatically recorded on weekly charts by an ink pen plotting system. The data were brought into the lab once a week, where they were interpreted by either a USC Baruch or Clemson Baruch Weather Technician and transformed into text files. The USC Baruch Data Manager imported these ascii files into Microsoft Excel and formatted them for the purposes of this database. The final data are in text (.csv) and .xls formats.

Clemson/Hobcaw NWS:
The raw data were recorded onto a form each time that the Weather Technician read the dip-stick rain gauge. The data were entered into Microsoft Excel software by USC Baruch Weather Technicians and Data Managers and edited. The final data are in text (.csv) and .xls formats.

USC NWS:

The raw data were recorded onto a form each time that the Weather Technician read the rain gauge. The data were entered into Microsoft Excel software by USC Baruch Weather Technicians and Data Managers and edited. The final data are in text (.csv) and .xls formats.

NIW NERR:
Raw CR10X .dat files are imported directly from the weather station's data logger in comma delimited format. These data files were then read into Microsoft Excel software, edited, and saved in text (.csv) and .xls formats.

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Belle W. Baruch Institute for Marine Biology and Coastal Research
8.1 Originator: North Inlet - Winyah Bay (NIW) National Estuarine Research Reserve
8.1 Originator: D. Allen
8.1 Originator: A. Lohrer
8.2 Publication Date: 20021111
8.4 Title: North Inlet - Winyah Bay (NIW) National Estuarine Research Reserve Meteorological Data, North Inlet Estuary, Georgetown, South Carolina: 2001.
8.6 Geospatial Data Presentation Form: MS Access database and tab delimited text (spreadsheet)
8.8 Publication Information:
8.8.1 Publication Place: Georgetown, South Carolina
8.8.2 Publisher: NERR Centralized Data Management Office
8.10 Online Linkage: http://cdmo.baruch.sc.edu
8.11 Larger Work Citation:
8. Citation Information:
8.1 Originator: National Oceanic and Atmospheric Administration (NOAA)
8.1 Originator: Office of Ocean and Coastal Resource Management (OCRM)
8.1 Originator: National Estuarine Research Reserve System (NERR)
8.2 Publication Date: 2002
8.4 Title: NERR System-Wide Monitoring Program (SWMP)
8.6 Geospatial Data Presentation Form: tab delimited text (spreadsheet)
8.8 Publication Information:
8.8.1 Publication Place: Georgetown, South Carolina
8.8.2 Publisher: NERR Centralized Data Management Office
8.10 Online Linkage: http://cdmo.baruch.sc.edu

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Belle W. Baruch Institute for Marine Biology and Coastal Research
8.1 Originator: North Inlet - Winyah Bay (NIW) National Estuarine Research Reserve
8.1 Originator: D. Allen
8.1 Originator: A. Lohrer
8.2 Publication Date: Unpublished material
8.4 Title: North Inlet - Winyah Bay (NIW) National Estuarine Research Reserve Meteorological Data, North Inlet Estuary, Georgetown, South Carolina: 2000.
8.6 Geospatial Data Presentation Form: MS Access database and tab delimited text (spreadsheet)
8.11 Larger Work Citation:
8. Citation Information:
8.1 Originator: National Oceanic and Atmospheric Administration (NOAA)
8.1 Originator: Office of Ocean and Coastal Resource Management (OCRM)
8.1 Originator: National Estuarine Research Reserve System (NERR)
8.2 Publication Date: 2001
8.4 Title: NERR System-Wide Monitoring Program (SWMP)
8.6 Geospatial Data Presentation Form: tab delimited text (spreadsheet)
8.8 Publication Information:
8.8.1 Publication Place: Georgetown, South Carolina
8.8.2 Publisher: NERR Centralized Data Management Office URL: http://cdmo.baruch.sc.edu

1.14 Cross Reference:
8. Citation Information
8.1 Originator: Belle W. Baruch Institute of Coastal Ecology and Forest Science
8.1 Originator: National Weather Service
8.1 Originator: T. Williams
8.1 Originator: M. Gibson
8.2 Publication Date: unpublished material
8.4 Title: National Weather Service Data for Hobcaw Barony
8.6 Geospatial Data Presentation Form: hardcopy handwritten data sheets

1.14 Cross Reference:
8. Citation Information
8.1 Originator: Belle W. Baruch Institute for Marine Biology and Coastal Research
8.1 Originator: North Inlet – Winyah Bay (NIW) National Estuarine Research Reserve
8.1 Originator: D. Allen
8.1 Originator: E. Chipouras
8.2 Publication Date: 20020701
8.4 Title: North Inlet – Winyah Bay (NIW) National Estuarine Research Reserve Meteorological Data, North Inlet Estuary, Georgetown, South Carolina: 1997 – 1999.
8.6 Geospatial Data Presentation Form: comma delimited text and spreadsheet
8.8 Publication Information:
8.8.1 Publication Place: Belle W. Baruch Marine Field Laboratory, Georgetown, South Carolina, USA
8.8.2 Publisher: The Belle W. Baruch Institute for Marine Biology and Coastal Research, Baruch Marine Field Lab, University of South Carolina
8.10 Online Linkage: http://links.baruch.sc.edu/data/
8.11 Larger Work Citation:
8. Citation Information:
8.1 Originator: National Oceanic and Atmospheric Administration (NOAA)
8.1 Originator: Office of Ocean and Coastal Resource Management (OCRM)
8.1 Originator: National Estuarine Research Reserve System (NERR)
8.2 Publication Date: 2002
8.4 Title: NERR System-Wide Monitoring Program (SWMP)
8.6 Geospatial Data Presentation Form: tab delimited text (spreadsheet)
8.8 Publication Information:
8.8.1 Publication Place: Georgetown, South Carolina
8.8.2 Publisher: NERR Centralized Data Management Office URL: http://cdmo.baruch.sc.edu

1.14 Cross Reference:
8. Citation Information
8.1 Originator: W.K. Michener
8.1 Originator: D.M. Allen
8.1 Originator: E.R. Blood
8.1 Originator: T.A. Hiltz
8.1 Originator: B. Kjerfve
8.1 Originator: F.H. Sklar
8.2 Publication Date: 1990
8.4 Title: Climatic Variability and Salt Marsh Ecosystem Response: Relationship to Scale. In: D. Greenland and W. Lloyd, Jr. (eds.): Climate Variability and Ecosystem Response: Proceedings of a long-term ecological research workshop; Boulder, CO. Gen. Tech. Rep. SE-65
8.6 Geospatial Data Presentation Form: scientific publication
8.8 Publication Information:
8.8.1 Publication Place: Asheville, NC
8.8.2 Publisher: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station
8.9 Other Citation Details: 90pp.

1.14 Cross Reference:
8. Citation Information
8.1 Originator: W.K. Michener

8.1 Originator: B. Kjerfve
8.1 Originator: D. Greenland (editor)
8.2 Publication Date: 1987
8.4 Title: North Inlet, SC. P.56-60 In: D. Greenland (ed.): The Climate of the Long-Term Ecological Research Sites.
8.6 Geospatial Data Presentation Form: scientific publication

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: W.K. Michener (Editor)
8.1 Originator: A.B. Miller (Editor)
8.1 Originator: R. Nottrott (Editor)
8.2 Publication Date: 1990
8.4 Title: Long-Term Ecological Research Network Core Data Set Catalog
8.6 Geospatial Data Presentation Form: catalog in book and on-line form
8.8 Publication Information:
8.8.1 Publication Place: Columbia, South Carolina USA
8.8.2 Publisher: Belle W. Baruch Institute for Marine Biology and Coastal Research, University of South Carolina
8.9 Other Citation Details: Published for the Long-Term Ecological Research Network

The following databases (with the exception of the merged dataset) are all part of the larger Michener, Miller, and Nottrott (1990) work listed above:

1.14 Cross Reference:
8. Citation Information
8.1 Originator: Belle W. Baruch Institute for Marine Biology and Coastal Research
8.1 Originator: F.J. Vernberg
8.1 Originator: B. Kjerfve
8.1 Originator: W.K. Michener
8.2 Publication Date: 20011219
8.4 Title: Long Term Ecological Research (LTER) Climate Data with Water Parameters from North Inlet Meteorological Station, North Inlet Estuary, Georgetown, South Carolina: 1982-1996.
8.6 Geospatial Data Presentation Form: comma delimited digital data and spreadsheet
8.8 Publication Information:
8.8.1 Publication Place: Belle W. Baruch Marine Field Laboratory, Georgetown, South Carolina, USA
8.8.2Publisher: The Belle W. Baruch Institute for Marine Biology and Coastal Research, Baruch Marine Field Lab, University of South Carolina
8.9 Other Citation Details: Data Set Code: NIN001
8.10 Online Linkage: http://links.baruch.sc.edu/data/

1.14 Cross Reference:
8. Citation Information
8.1 Originator: W. K. Michener
8.1 Originator: D. Taylor
8.2 Publication Date: 19921201
8.4 Title: National Weather Service Data for North Inlet
8.6 Geospatial Data Presentation Form: comma delimited digital data and spreadsheet
8.8 Publication Information:
8.8.1 Publication Place: Belle W. Baruch Marine Field Laboratory, Georgetown, South Carolina, USA
8.8.2 Publisher: The Belle W. Baruch Institute for Marine Biology and Coastal Research, Baruch Marine Field Lab, University of South Carolina
8.9 Other Citation Details: Data Set Code NIN0002

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Dr. Elizabeth R. Blood
8.2 Publication Date: 1990
8.4 Title: Estuarine Surface Water Nutrient Chemistry and Water Quality Data for Clambank and Oyster Landing*
8.6 Geospatial Data Presentation Form: digital text

8.9 Other Citation Details: Data Set Code: NIN003

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Dr. Richard G. Zingmark
8.2 Publication Date: 1990
8.4 Title: Long-Term Variations in Phytoplankton Biomass in North Inlet Estuary*
8.6 Geospatial Data Presentation Form: digital text
8.9 Other Citation Details: Data Set Code: NIN004

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Dr. Leonard R. Gardner
8.2 Publication Date: 1990
8.4 Title: Suspended Sediment*
8.6 Geospatial Data Presentation Form: digital text
8.9 Other Citation Details: Data Set Code: NIN005

*The three databases above were merged into the following data set:
1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Elizabeth Blood (Daily Estuarine Surface Water Nutrient Chemistry and Water Quality Data)
8.1 Originator: Leonard Robert Gardener (Suspended Sediments)
8.1 Originator: Richard Zingmark (Phytoplankton Biomass - Chlorophyll a and Phaeophytin)
8.1 Originator: Belle W. Baruch Institute for Marine Biology and Coastal Research
8.2 Publication Date: 19981120
8.4 Title: Long Term Ecological Research (LTER) Daily Estuarine Surface Water Nutrient and Water Quality, Suspended Sediment, and Chlorophyll a Data for the North Inlet Estuary, Georgetown, SC: 1978-1993
8.6 Geospatial Data Presentation Form: comma delimited digital data and spreadsheet
8.5 Edition: First Edition
8.7 Series Information:
8.7.1 Series Name: Baruch Institute's Water Chemistry, Chlorophyll a, and Suspended Sediment Long-Term Monitoring Database for the North Inlet Estuary, South Carolina
8.7.2 Issue Identification: September 1, 1978 - June 30, 1993
8.8 Publication Information:
8.8.1 Publication Place: Georgetown, South Carolina USA
8.8.2 Publisher: Belle W. Baruch Institute for Marine Biology and Coastal Research, University of South Carolina
8.10 Online Linkage: http://links.baruch.sc.edu/data/

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Dr. Elizabeth R. Blood
8.2 Publication Date: 1990
8.4 Title: Precipitation Chemistry
8.6 Geospatial Data Presentation Form: digital text
8.9 Other Citation Details: Data Set Code: NIN006

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Dr. James T. Morris
8.2 Publication Date: 1990
8.4 Title: Spartina Production
8.6 Geospatial Data Presentation Form: digital text
8.9 Other Citation Details: Data Set Code: NIN007

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Dr. Dennis M. Allen

8.2 Publication Date: 1990
8.4 Title: Motile Epibenthos, Macrozooplankton
8.6 Geospatial Data Presentation Form: digital text
8.9 Other Citation Details: Data Set Code: NIN008

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Dr. Stephen E. Stancyk
8.2 Publication Date: 1990
8.4 Title: Zooplankton (153 µm)
8.6 Geospatial Data Presentation Form: digital text
8.9 Other Citation Details: Data Set Code: NIN009

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Dr. Dennis M. Allen
8.2 Publication Date: 1990
8.4 Title: Fishes, Shrimps and Crabs: Oyster Landing Basin
8.6 Geospatial Data Presentation Form: digital text and spreadsheet
8.9 Other Citation Details: Data Set Code: NIN010

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Dr. Keith L. Bildstein
8.2 Publication Date: 1990
8.4 Title: Size of the Feeding Population of White Ibises (Eudocimus albus), an Avian Secondary Consumer
8.6 Geospatial Data Presentation Form: unknown
8.9 Other Citation Details: Data Set Code: NIN011

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Dr. Keith L. Bildstein
8.2 Publication Date: 1990
8.4 Title: Size of the Nesting Population of White Ibises (Eudocimus albus), an Avian Secondary Consumer
8.6 Geospatial Data Presentation Form: unknown
8.9 Other Citation Details: Data Set Code: NIN012

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Dr. Robert J. Feller
8.2 Publication Date: 1990
8.4 Title: North Inlet Subtidal Macrobenthos
8.6 Geospatial Data Presentation Form: digital text
8.9 Other Citation Details: Data Set Code: NIN013

1.14 Cross Reference:
8. Citation Information:
8.1 Originator: Dr. Bruce C. Coull
8.2 Publication Date: 1990
8.4 Title: Meiobenthos Abundance, Copepod Species Data
8.6 Geospatial Data Presentation Form: digital text
8.9 Other Citation Details: Data Set Code: NIN014

2. Data Quality Information
2.1 Attribute Accuracy
2.1.1 Attribute Accuracy Report

The dates in service listed below represent the general time frame that the particular sensor was used to collect data – not the dates that the sensor's data were used in the RAINDAZE database. For specific information on when the

data from these sensors was used in the database, please see the Field Methodology Description section. The following accuracy information was obtained from the sensor instruction manuals produced by the manufacturers. Copies of these manuals are maintained on-site at the Baruch Marine Lab.

LTER Gauges R1-R8

Sensor: Universal Recording Rain Gauge – 5-780 Series
Manufacturer: Belfort Instrument Company
Sensitivity: 0.01 inches
Accuracy: 0.3 percent of full scale
Dates in service: 4/1/1978 – 8/31/1996 (most of the gauges were discontinued after 8/13/1982, but the R8 gauge was maintained throughout this period)

Clemson/Hobcaw NWS

Sensor: Dip-stick (non-recording) Precipitation Gauge – Model Number: MP-2 (Standard U.S. Weather Bureau type)
Manufacturer: Frise Engineering
Range of indication: 0.01 inches
Accuracy: Unknown
Dates in service: 1981 - 2002

USC NWS

Sensor: Dip-stick (non-recording) Precipitation Gauge – Model Number: 6310 (Standard U.S. Weather Bureau type)
Manufacturer: Qualimetrics
Range of indication: 0.01 inches
Accuracy: Unknown
Dates in service: 12/1986– 2/1996

NIW NERR

Information on the accuracy of these rain gauges was taken from the manufacturer's instruction manual. These manuals are stored on site at the Baruch Marine Field Lab and maintained by the NERR Weather Technician.

Sensor: Tipping Bucket Rain Gauge – Model Number: 2500
Manufacturer: Sierra-Misco Environment, Ltd.
Range of indication: 0.1 mm
Accuracy: 1.0 percent at less than or equal to 2inches/hr
Dates in service: 7/2/1997 – 5/17/2001

Sensor: Tipping Bucket Rain Gauge – Model Number: 525WS
Manufacturer: Campbell Scientific
Range of indication: 0.1 mm
Accuracy: 1.0 percent at less than or equal to 2inches/hr
Dates in service: 5/17/2001 – 12/31/2001

2.1.2 Quantitative Attribute Accuracy Assessment

2.1.2.1 Attribute Accuracy Value:

Variable	Number of Decimal Places
Start Date (mm/dd/yyyy)	0
Start Time (hhmm)	0
End Date (mm/dd/yyyy)	0
End Time (hhmm)	0
Rain (millimeters)	1
Rain (inches)	2

2.1.2.2 Attribute Accuracy Explanation:

The attribute accuracy values above were based on the accuracy, resolution, and range of measurement information available for each sensor. The number of decimal places published in the final database is meant to best represent the precision and accuracy of the data.

Start Date: The start date values are integers and have no decimal places assigned to them, they are accurate to the whole number.

Start Time: The start time values are integers and have no decimal places assigned to them. Because no standard clock time was used and the charts can't be read to the minute, times from both watches and charts are accurate to within a 5-10 minute interval.

End Date: The end date values are integers and have no decimal places assigned to them, they are accurate to the whole number.

End Time: The end time values are integers and have no decimal places assigned to them. Because no standard clock time was used and the charts can't be read to the minute, times from both watches and charts are accurate to within a 5-10 minute interval.

Rain (millimeters): Based on the range of indications, the accuracies (when available), and the minimum amount of rain recorded by the sensors, it was determined that, for measurements in millimeters, a number in the hundredths place would not be accurate. Values were rounded to the nearest 10^{th} (1 decimal place).

Rain (inches): Based on the range of indications, the accuracies (when available), and the minimum amount of rain recorded by the sensors, it was determined that, for measurements in inches, a number in the thousandths place would not be accurate. Values were rounded to the nearest 100^{th} (2 decimal places).

2.2 Logical Consistency Report:
Not applicable

2.3 Completeness Report:

Missing Data:
This section identifies periods of data that are missing from the RAINDAZE database. This database is a compilation of other data sets; every effort was made to replace periods of missing data that occurred during rainfall events with data from another dataset. However, because rainfall in this database is reported by event, or by days that included rain events, and because little documentation exists regarding this database (prior to this document), it is often difficult to discern whether data is missing or if there simply was no rainfall event for a given period. To a large degree, the Data Manager must trust that the Weather Technicians who originally compiled the database were thorough in their efforts to replace significant periods of missing data. As a result, this missing data documentation will only deal with time periods when there were no rain gauges available, there were documented problems with the rain gauge in use, or that the Data Manager believes were likely to include rainfall events. Missing data occurred during the following time periods:

4/17/1978 – 4/24/1978
4/10/1979 – 4/17/1979
5/9/1979 – 5/11/1979
8/29/1979 – 2/28/1980
3/1/1980 – 3/4/1980
4/23/1985 – 5/19/1985
1/1/1997 – 1/31/1997

Anomalous Data:
This section identifies data that have been determined to be inaccurate and removed from the final data set by the Data Manager, provides justification for the removal of the inaccurate data, and identifies "questionable" data. Questionable or suspect data are data that may be compromised in quality but remain in the data set. Wherever possible, both questionable and inaccurate data are correlated with information from relevant documentation that may help to explain any problems with the data. Data that have been removed from the final data set are still present in unedited and/or raw data files. The following anomalous data information is organized by year:

<u>1980</u>
Data Manager found data entry error for Gauge R8 on 9/29/1980 @ 0600. The correct entry is 0.10 inches. In the original digital files the value was incorrectly entered as 9.10 inches. The Data Manager changed the entry in all process and final files.

1982

Clemson/Hobcaw NWS rain gauge data was included in the process files on 8/1/1982 because the USC Weather Technician did not realize that the time of collection with the LTER R8 gauge on 7/31/1982 overlapped. The Data Manager removed the 8/1/1982 Clemson/Hobcaw NWS reading from the final files because it seemed most likely that the rainfall event was included in the dataset twice.

The Weather Technician included data from the LTER R8 gauge because he was unaware of the different data collection protocols, which resulted in overlapping 24-hour measurement periods (particularly when the Clemson/Hobcaw NWS gauge is not measured on the weekend). The Data Manager removed these LTER values and left only Clemson data in the database for this period. The following dates with LTER data removed are:
8/3/1982
8/11/1982
8/12/1982

Duplicate data from two different sources were included in the database from 12/11/1982 – 12/31/1982. The Data Manager removed the duplicated data from the second source, so that the entire month of December was Clemson/Hobcaw NWS data. The following duplicate dates were removed:
12/11/1982
12/19/1982
12/31/1982

1988

An overlapping period of measurement occurred when missing LTER gauge R8 data (recorded by event) was supplemented with data from the USC NWS gauge (recorded by 24-hour period, from 1000 to 1000). Any rainfall that occurred during the overlapping times would have been included in the dataset twice. Because the original weather technician included both readings in the dataset, the Data Manager will assume that there was good reason to do so and that there was additional rainfall outside of the event recorded by the R8 gauge. In addition, the amount of rain in question is negligible. However, this data should be considered questionable and used with care:
9/5/1988 – 9/6/1988

1989

A rain event measured by the USC NWS gauge was recorded in the RAINDAZE file as occurring between 1000 on 6/28/1989 and 1000 on 6/29/1989. After checking the raw data, the Data Manager discovered that this event actually occurred during the period from 1000 on 6/29/1989 to 1000 on 6/30/1989. The dates were corrected in the final files.

1990

An overlapping period of measurement occurred when missing LTER gauge R8 data (recorded by event) was supplemented with data from the USC NWS gauge (recorded by 24-hour period, from 1000 to 1000). The rainfall event recorded by the R8 gauge falls within the 24-hour time period recorded by the USC NWS gauge. Any rainfall that occurred during the overlapping times would have been included in the dataset twice. Because the original weather technician included both readings in the dataset, the Data Manager will assume that there was good reason to do so and that there was additional rainfall outside of the event recorded by the R8 gauge. In addition, the amount of rain in question is negligible. However, this data should be considered questionable and used with care:
7/1/1990 – 7/2/1990

1997

8/1/97 @ 0015 through 11/29/97 @ 1515: Rain readings from the CR10X datalogger were shifted over one decimal place. This was evident because the tipping-bucket rain gauge in use at the time measured in increments of 0.254 (trace equals 0.254) and readings for this period were recorded in increments of 0.0254. The data in the final version were corrected.

1998

1/12/98 @ 1115: Data Manager removed anomalous rain data point. The reading (91.4 mm, approx. 4 inches) was unbelievably high for a 15 minute total. In addition, the surrounding readings were all zero.

2001

3/29/2001 @ 1130: Rain gauge was tipped manually, therefore a 0.254mm value was recorded erroneously. This value was removed from the final version.

Additional Notes:
The following data were considered questionable and verified by the Data Manager as legitimate large rainfalls due to Tropical Storms/Hurricanes. The following web sites were used to verify these particular dates: http://www.nhc.noaa.gov and http://hurricane.csc.noaa.gov/hurricanes/. Other large rainfall events (not noted in this section) were verified by checking the raw data to ensure that the gauge seemed to be working properly. They may also result from tropical storms or heavy rainstorms even though they are not mentioned below.

1981: On 8/19/1981 Hurricane Dennis, 144.8mm
1985: On 7/25/1985 Hurricane Bob, 90.2 mm
On 11/22/1985 Hurricane Kate, 81.3 mm
1996: On 6/18/1996 – 6/19/1996, 118.1 mm of rainfall, heavy rains preceded Tropical Storm Arthur as it moved North up the coast, through the Carolinas
1999: On 9/15/1999 Hurricane Floyd, 227.0 mm

In addition, the large rainfall event recorded on 9/1/1996 (275.1 mm) may be misleading as it occurred over an 8-day period, through 9/9/1996.

2.5 Lineage
99.2.5.1 Methodology:
99.2.5.1.1 Methodology Type: Field Collection Procedures and Protocols
99.2.5.1.3 Methodology Description

Schedule for data sources:

4/1/1978 – 7/31/1982	LTER Gauge R8 located at Oyster Landing
8/1/1982 – 12/31/1982	Clemson/Hobcaw NWS Gauge located at the hanger.
1/1/1983 – 2/18/1985	LTER Gauge R5 located at the Floating Bridge*
2/19/1985 – 4/22/1985	LTER Gauge R5 located at the Floating Bridge
4/23/1985 – 5/19/1985	MISSING DATA
5/20/1985 - 1/21/1986	LTER Gauge R2 located Hobcaw/Crabhaul Road
1/21/1986 – 7/31/1988	LTER Gauge R8 located at Oyster Landing
8/1/1988 – 8/8/1988	USC NWS Gauge located at Oyster Landing
8/9/1988 – 9/5/1988	LTER Gauge R8 located at Oyster Landing
9/6/1988 – 9/12/1988	USC NWS Gauge located at Oyster Landing
9/13/1988 – 6/25/1989	LTER Gauge R8 located at Oyster Landing
6/26/1989 – 7/3/1989	USC NWS Gauge located at Oyster Landing
7/4/1989 – 9/18/1989	LTER Gauge R8 located at Oyster Landing
9/19/1989 – 9/31/1989	LTER Gauge R5 located at the Floating Bridge
10/1/1989 – 10/2/1989	LTER Gauge R1 located at Third & North Boundary Roads
10/3/1989 – 7/1/1990	LTER Gauge R8 located at Oyster Landing
7/1/1990 – 7/16/1990	USC NWS Gauge located at Oyster Landing
7/17/1990 – 8/31/1996	LTER Gauge R8 located at Oyster Landing
9/1/1996 – 11/30/1996	Clemson/Hobcaw NWS Gauge located at the Clemson Field Lab
11/30/1996 - 12/1/1996	USC NWS Gauge located at Oyster Landing
12/1/1996 – 12/2/1996	Clemson/Hobcaw NWS Gauge located at the Clemson Field Lab
12/3/1996 – 12/31/1996	USC NWS Gauge located at Oyster Landing
1/1/1997 – 1/31/1997	MISSING DATA
2/1/1997 – 4/30/1997	USC NWS Gauge located at Oyster Landing
5/1/1997 – 6/30/1997	Clemson/Hobcaw Gauge located at the Clemson Field Lab
7/1/1997 – 12/31/2001	NIW NERR Weather Station located at Oyster Landing

*There is no documentation specifying that the LTER R5 gauge was the source for this data. However, after talking to former USC Baruch employees, examining the data, and investigating the history behind each rain gauge, the Data Manager determined that this was the most likely source.

LTER Gauges R1-R8

Sensors: Belfort Universal Recording Rain Gauges, Series: 5-780

In 1978, eight Belfort recording rain gauges were installed in various locations throughout the Hobcaw Barony property as part of Clemson and USC's joint LTER project (See digital aerial photograph for gauge locations: "RAINDAZE.GAUGES.jpg). The rain gauges began collecting data on April 1, 1978. Rain data were automatically recorded, by an ink pen plotting system, on charts that spanned approximate weeklong time periods. A Weather Technician visited each rain gauge on a weekly basis to collect the chart for the previous week and ensure that the gauge was working properly for the next week. The charts were brought back to the field lab and interpreted by the weather technician (See Process Section for more details). Of these eight rain gauges, one was the primary rain gauge for this database. Gauge R8 was located at Oyster Landing on Crab Haul Creek, near USC's Baruch Marine Field Lab. The USC Weather Technician maintained this gauge after most of the other gauges were discontinued; it remained in service until 6/10/1997. Occasionally data from one of the other seven LTER gauges or one of the National Weather Service gauges were used to fill in periods of missing data, but the R8 gauge readings make up the bulk of the RAINDAZE database for this time frame.

Clemson/Hobcaw NWS
Sensor: Dip-stick (non-recording) Standard US Weather Bureau type precipitation gauge (NWS approved).

Hobcaw Barony's Baruch Foundation employees maintained this rain gauge from 1981 – 1989. It was moved to the Clemson Field Lab in 1989. The Foundation employees and the Clemson Weather Technician read the rain gauge at approximately 4:00 pm every day. Data were recorded on a form and apply to the previous 24-hour period. Readings were not always taken on weekends, so Monday afternoon readings sometimes include any rainfall events that may have occurred over the weekend. In general, if a rain event occurred every effort was made to check the rain gauge on weekends as well. Data from the Clemson/Hobcaw NWS rain gauge were inserted into the RAINDAZE database when it was necessary to fill in periods of missing data resulting from problems with the LTER R8 gauge.

USC NWS
Sensor: Qualimetrics 6310 Dip-stick (non-recording) precipitation gauge, Standard U.S. Weather Bureau type (NWS approved)

This rain gauge was part of a weather station supported by the National Weather Service and installed near the USC Baruch Marine Field Lab and Oyster Landing. In addition to the rain gauge, the weather station was composed of an instrument shelter, maximum and minimum thermometers (Qualimetrics 4421), Hygrothermograph (Qualimetrics 5020), and Barometer (Qualimetrics 7010-A), all of which were purchased from Qualimetrics Corporation of Sacramento, CA and NWS approved. The instrument shelter was located near the Oyster Landing Research site on Crab Haul Creek and the rain gauge was located approximately 25 feet from the instrument shelter in a grass clearing.

The USC Weather Technician visited the NWS weather station every day at approximately 10:00 am and recorded the high and low temperatures for the previous 24-hours onto a form. To the best of our knowledge, rain data were only collected from this rain gauge and used in the RAINDAZE database when the LTER R8 chart-recording rain gauge was malfunctioning. The NWS forms include rain data taken from the R8 gauge when it was available, and from the USC NWS rain gauge only when necessary.

NIW NERR
Sensor: Sierra-Misco Envrionment Ltd. Tipping Bucket Rain Gauge, Model 2500, (7/2/1997 – 5/17/2001)
Sensor: Campbell Scientific Tipping Bucket Rain Gauge, Model TE 252WS, (5/17/2001 – 12/31/2001)

On 7/2/1997 the NIW NERR weather station began collecting weather data (the NERRMET database). The weather station is located at the end of an 800-foot boardwalk (Oyster Landing Pier) ending in Crab Haul Creek. The majority of the weather station sensors are located on an aluminum tower, which is mounted to the pier head. The rain gauge is located on a small eastern-extending platform off of the boardwalk, just before the pier head. NERR's Centralized Data Managmenet Office (CDMO) Operations Manual and operation manuals supplied by Campbell Scientific were used as guidelines for assembling the weather station and meteorological data collection protocols. The CDMO Operations Manual Version 4.0 can be found on the CDMO web site (http://cdmo.baruch.sc.edu) under General Information.

The sensors and data collection schedule on the NIW NERR weather station are controlled by the CDMO Data Logger Program (nerr30.csi), loaded onto a Campbell Scientific CR10X datalogger. As of 8/11/1999, the sensors were wired

to the CR10X following the protocol outlined in the CDMO Operations Manual (Version 4.0). The CR10X uses the five-second data (data were based on a 10-second interval from 7/2/97 to 8/22/97) collected from the rain gauge sensor to produce 15-minute totals, which are then downloaded to a personal computer in the Baruch Marine Field Lab using PC208W software. The 5-second data are then discarded. Rain data were collected on a 15-minute basis and readings were taken 24 hours a day, every day of the year, except when the rain gauge or the entire meteorological station was down.

For complete documentation of all NERRMET data from 1997-1999 please see the Methodology Description in the NERRMET Metadata document. The Metadata and complete database can be found at http://links.baruch.sc.edu/data/, under the Data, Maps, and Research Resources link. For complete documentation of all NERR Meteorological data for 2000 (in progress) and 2001, please see the complete datasets at http://cdmo.baruch.sc.edu. Data from these periods were taken directly from the final NERR data and formatted for the RAINDAZE database.

2.5.1.4 Methodology Citation:
8. Citation Information
8.1 Originator: National Estuarine Research Reserve System, Centralized Data Management Office
8.1 Originator: Belle W. Baruch Institute for Marine Biology and Coastal Research
8.1 Originator: V. Ogburn-Matthews
8.1 Originator: M.E. Crane
8.1 Originator: W. Jefferson
8.1 Originator: T.D. Small
8.1 Originator: D. Porter
8.2 Publication Date: 20000207
8.4 Title: CDMO Operations Manual, Version 4.0
8.6 Geospatial Data Presentation Form: Manual
8.8 Publication Information
8.8.1 Publication Place: Belle W. Baruch Marine Laboratory, Georgetown, SC
8.8.2 Publisher: National Estuarine Research Reserve System, Centralized Data Management Office

2.5.1.4 Methodology Citation:
8. Citation Information
8.1 Originator: W.E. Thompson
8.1 Originator: S. Ross
8.2 Publication Date: 19970115
8.4 Title: North Carolina National Estuarine Research Reserve Meteorological Monitoring Program – Standard Operating Procedure for Collection of Data and Maintenance of Equipment
8.6 Geospatial Data Presentation Form: In-house Manual
8.8 Publication Information:
8.8.1 Publication Place: Wilmington, NC
8.8.2 Publisher: North Carolina NERR

2.5.1.4 Methodology Citation:
8. Citation Information
8.1 Originator: Campbell Scientific Corporation
8.2 Publication Date: unknown
8.4 Title: Sensor operation manuals
8.6 Geospatial Data Presentation Form: Manual
8.8 Publication Information:
8.8.1 Publication Place: Logan, UT
8.8.2 Publisher: Campbell Scientific Corporation

2.5.1.4 Methodology Citation:
8. Citation Information
8.1 Originator: D. Greenland
8.2 Publication Date: 1986
8.4 Title: Standardized Meteorological Measurements for Long-Term Ecological Research Sites
8.6 Geospatial Data Presentation Form: Scientific publication
8.8 Publication Information:

8.8.1 Publication Place: Bulletin of the Ecological Society of America
8.8.2 Publisher: The Ecological Society of America
8.9 Other Citation Details: 67(4): 275-277

2.5.1.4 Methodology Citation:
8. Citation Information
8.1 Originator: The American Association of State Climatologists
8.2 Publication Date: 198510
8.4 Title: Heights and Exposure Standards for Sensors on Automated Weather Stations
8.6 Geospatial Data Presentation Form: Publication
8.8 Publication Information:
8.8.1 Publication Place: The State Climatologist, Publication of the American Association of State Climatologists
8.8.2 Publisher: The American Association of State Climatologists

2.5.1.4 Methodology Citation:
8. Citation Information
8.1 Originator: Belfort Instrument Company
8.2 Publication Date: 1986
8.4 Title: Instruction Manual, Catalog Number 5-780 Series, Universal Recording Rain Gauge
8.6 Geospatial Data Presentation Form: Manual
8.8 Publication Information:
8.8.1 Publication Place: Baltimore, Maryland
8.8.2 Publisher: Belfort Instrument Company
8.9 Other Citation Details: Publication date for original instruction manuals is unknown.

2.5.2 Process Step
2.5.2.1 Process Description

Raw Data
The Weather Technician interpreted the rainfall event start and end dates, times, and hourly amounts from the LTER R1-R8 charts after they were brought back to the lab. Data from 4/1/1978 to 7/31/1982 were recorded as daily amounts with rainfall values interpreted for each hour. These data were recorded onto Fortran data sheets by hand. The data sheets were then used to key punch cards that were read into the mainframe, producing yearly digital files in ascii format. The ascii files contain the date, a time indicator ("1" was used to designate the 12-hour period from 0000 – 1200 and "2" for 1200 – 2400), and a rainfall total in inches for each hour (12 entries) for all 8 rain gauges.

Beginning on 2/19/1985, data from the remaining LTER rain gauges (most were discontinued after 1982) were recorded by event. For the R8 gauge, a start and end date and time (hour) and the amount of rainfall for the entire event were interpreted by the Weather Technician and recorded by hand in the RAINDAZE notebook. Data from other LTER gauges were only interpreted and used when there was a problem with the R8 gauge. These data were later input into a Microsoft Excel spreadsheet, containing the core LTER R8 data, by the Weather Technician.

Process Data
The Weather Technician imported or inserted digital data from all other sources into the Excel spreadsheet as necessary to supplement the LTER R8 data and compile a complete rain database called RAINDAZE. The Data Manager formatted this RAINDAZE file for consistency with a column for the start date (mm/dd/yyyy), start time (hhmm), end date (mm/dd/yyyy), end time (hhmm), rain (millimeters), and rain (inches) for each entry. If these values were not already part of the digital file they were added based on the protocols used to collect the data. For instance, the Hobcaw/Clemson NWS data was collected at approximately 4:00 pm every day, and the rain value applies to the previous 24 hours from the date recorded. For the purposes of this data set, the previous date was inserted in the start date column and the start and end times of 1600 were added. Calculated values were added for either inches or millimeters, depending on which unit was used for the original data.

The RAINDAZE file created by the Weather Technician began on 2/18/1981 and therefore did not include all of the LTER R8 data that were present in the Fortran data sheets mentioned in the raw data section above. In order to rescue these data, the Data Manager used the ascii files to create yearly Microsoft Excel files for LTER Gauge R8. The Data Manager then removed any extraneous dates present in the file as a result of the data input program (2/30, 2/31, 4/31, 6/31, 9/31, and 11/31) and summed 24-hour totals (from time 0000 to 2400) for the days that rain events occurred. All

dates when rain events didn't occur were removed. The start date (mm/dd/yyyy), start time (hhmm), end date (mm/dd/yyyy), and end time (hhmm) columns were added and formatted for consistency with the RAINDAZE database. The original date column, which was in dd/mm/yy format, and the time indicator column were removed. A rainfall amount in millimeters column was also added and values were calculated and formatted. These data were then added to the RAINDAZE file and data in the overlapping time period were verified for accuracy. These readings matched exactly, and as a result, the rescued data from 1978 – 1981 were added to the database.

As of July 1997, the NIW NERR weather station's rain gauge became the primary source for rain data. The Data Manager extracted NIW NERR rain data from NERRMET database Excel files and converted the data from 15-minute totals to daily totals using SAS (version 8) statistical analysis software. These daily totals were then imported back into Microsoft Excel, formatted for consistency, and added to the RAINDAZE file. For more information on the data collection procedures or process steps taken with the NERRMET data before it was incorporated into this database, see the individual database Metadata at http://cdmo.baruch.sc.edu/ or http://links.baruch.sc.edu/data/ (Under the Data, Maps, and Research Resources link).

The Data Manager then broke this composite RAINDAZE file into yearly Excel files. Due to varying data collection procedures, some yearly files contain daily totals for days that a rain event occurred and other files contain rain event totals, which may span multiple days. Files containing daily totals were titled "RAINDAZE.YYYY.DAYEVENT" and have start times and end times delineating a 24-hour period (0000 – 24000, 1600 – 1600, 1000 – 1000). Files containing event totals were titled "RAINDAZE.YYYY.EVENT" and contain the actual start and end date/times of the rain event. In the 1985 and 1996 files, data were collected in both manners. These files were titled according to the procedure that was used for the majority of the data. The start and end date/times indicate which method was used.

All files were checked for missing data and/or anomalous data. A second quality check was performed when the data were graphed using SigmaPlot (version 8.0). The Data Manager verified all instances of large rainfall amounts by checking the raw charts or data files to make sure that the entry seemed plausible based on the surrounding information and/or checking for tropical storms or hurricanes that were in the area at the time. These tropical storm events are mentioned in the anomalous data section of this documentation. It is important to remember that some of the data are presented by rainfall event, which may span a time period of multiple days, and represent large amounts of rainfall. Anomalous data were evaluated by the Data Manager and removed if they were determined to be erroneous. All missing and anomalous/erroneous data are reported in the Completeness Report portion of this documentation.

Yearly DAYEVENT and EVENT files were used to create the "RAINDAZE.1978-2001.MONTHSUMS" and "RAINDAZE.1978-2001.YEARSUMS" files. The month sums file contains columns for month designation (1-12), year designation (yyyy), rain (millimeters), and rain (inches). Months without enough data to sum are marked with a ".". The year sums file contains columns for the year (yyyy), rain (millimeters), and rain (inches). Data for years with "significant" (liberal determination made by the Data Manager) amounts of data missing (and therefore skewed sums) are marked with an "*". Summary data may contain missing data points; users should consult the missing data section in the Completeness Report portion of this document before making use of any summary data. Both the MONTHSUMS and YEARSUMS files were formatted for consistency with the other RAINDAZE database files and graphed.

Archival of Raw Data Sheets and Charts

Prior to March of 1980, the Fortran data sheets are the only "raw" data available; the actual weekly rain charts from 1978 and 1979 were not archived. Data entry sheets for the time period 1978-1982 were scanned into digital (.jpg) images (December 2002) and archived as part of this database (January 2003). Files were named in the following format: "RAINDAZE.R1-R8.MMMDD-MMMDD.YYYY.jpg," where R1-R8 denotes that these sheets include information on all 8 gauges as opposed to applying to only one gauge at a time. The dates in the file name are the dates from the first and last entry on the sheet, NOT NECESSARILY THE ACTUAL DATE RANGE, because data for all 8 gauges and varying dates may be contained on the same sheet. If this naming protocol resulted in more than one data sheet having the same name, the first sheet (with the first gauges in numerical order) was labeled RAINDAZE.R1-R8.MMMDD-MMMDD.A.YYYY.jpg, and the second sheet was labeled with a "B," etc. If the data sheet contained data spanning the end of one year and the beginning of the next, both years were included in the name, and the file was included in the directories for both years. Fortran data entry sheets were no longer used after 1982.

The raw rain charts are available beginning in February and March of 1980 (availability varies by rain gauge) and were scanned into a digital image (December 2002) and archived as part of this database (January 2003). Files were named in the following format: "RAINDAZE.R#.MMMDD-MMMDD.YYYY.jpg." As with the Data Sheets above, if the

chart spanned two years, both years were included in the name and the file was included in the directories for both years.

Raw hand-written datasheets from the Clemson/Hobcaw NWS rain gauge were also scanned into digital images (December 2002) and archived as part of the RAINDAZE database (January 2003). Files were named using the following protocol: "CLEMSON.NWS.MMMYYYY.RAW.jpg."

The Raw Data Archive CD contains the .jpg files for the raw data charts, Fortran data entry sheets, and Clemson/Hobcaw NWS datasheets. In addition, this archive CD contains the raw .dat files produced by the CR10X datalogger (NIW NERR weather station) and complete lists of all filenames.

Data Integration and Verification

Clemson/Hobcaw NWS data are available from 1981 through 2001, but only used for the specified periods in this database. In order to ensure, to a reasonable degree, that these databases were similar enough in accuracy to be combined, data from the Clemson/Hobcaw NWS rain gauge were compared to data from both the USC NWS and the NIW NERR gauges. The Clemson/Hobcaw NWS data were compared to the 1994 USC NWS data and the 2000 NIW NERR data with a SAS (version 8) correlation analysis program. These years were chosen because they had relatively few missing data points. Both analyses found no significant difference between the data sets, with p values of less than 0.0001 and 0.0001 for the 1994 and 2000 comparisons, respectively.

2.5.2.3 Process Date: 200301

3. Spatial Data Organization Information
3.1 Indirect Spatial Reference:
Hobcaw Barony and North Inlet Estuary are located in Georgetown County, South Carolina, USA
3.2 Direct Spatial Reference Method: Point

5. Entity and Attribute Information
5.2 Overview Description
5.2.1 Entity and Attribute Overview

Start Date: The date on which the rain event started. If recording by event, this may or may not be the same as the end date, if recording by "day-event" (24-hour period that included rainfall), this will be the same as the end date.
Start Time: The time that the rain event started. If measuring by event, this will be an actual time, if measuring by "day-event" this will be a standard time depending on the gauge used for the database (0000, 1000, or 1600).
End Date: The date on which the rain event ended. It may or may not be the same as the start date. If recording by event, this may or may not be the same as the start date, if recording by "day-event," this will be the same as the start date.
End Time: The time that the rain event ended. If measuring by event, this will be an actual time, if measuring by "day-event" this will be a standard time depending on the gauge used for the database (2400, 1000, or 1600).
Rain (millimeters): The amount of rain that fell during either a 24-hour period or a rainfall event, measured in millimeters.
Rain (inches): The amount of rain that fell during either a 24-hour period or a rainfall event, measured in inches.

Variable	Type (total size of value.number of decimal places)	Range of Measurement (min-max)
Start Date	Integer	4/1/1978 – 12/31/2001
Start Time	Integer	0000 – 2400, 30-minute increments
End Date	Integer	4/1/1978 – 12/31/2001
End Time	Integer	0000 – 2400, 30-minute increments
Rain (mm)	Real (6.1)	0.0 – 300.0 millimeters
Rain (inches)	Real (5.2)	0.00 – 12.00 inches

5.2.2 Entity and Attribute Detail Citation:
Definitions were developed by Baruch Institute's researchers, data managers, and technicians; no published standards for entity definitions were used to define the entities used in this dataset. However, the general use of these entity type definitions are understood by the climatologic and meteorological communities at large.

6. Distribution Information

6.1 Distributor:

10.2 Contact Organization Primary

10.1.2 Contact Organization:	Univ. of South Carolina's Baruch Institute
10.1.1 Contact Person:	Ginger Ogburn-Matthews
10.3 Contact Position:	Research Data Manager & Analyst
10.4 Contact Address	
10.4.1 Address Type:	Mailing Address
10.4.2 Address:	USC Baruch Marine Field Lab
10.4.2 Address:	PO Box 1630
10.4.3 City:	Georgetown
10.4.4 State or Province:	South Carolina
10.4.5 Postal Code:	29440
10.4.6 Country:	USA
10.5 Contact Voice Telephone:	(843) 546 6219
10.7 Contact Facsimile Telephone:	(843) 546-1632
10.8 Contact Electronic Mail Address:	ginger@belle.baruch.sc.edu
10.9 Hours of Service:	8:30 am to 4:30 pm EST/EDT Mon.- Friday

6.2 Resource Description:

Dataset Identification names:

NERRMET
LTERMET
North Inlet Weather
RAINDAZE Database
North Inlet Meteorological Data
Rain Data
Precipitation Data

FileName Identification names:

The RAINDAZE Final Database 78-2001 Compact Disk contains the following files in the following directories:

FINAL.DOCUMENTATION: (Directory Size: 1.72 MB, 4 files)

RAINDAZE.1978-2001.FGDC.METADATA. doc (this document)
RAINDAZE.1978-2001.FGDC.METADATA. txt
RAINDAZE.GAUGES.jpg
USCNWS.GAUGE.jpg
CLEMSON.HOBCAW.NWS1.jpg
CLEMSON.HOBCAW.NWS2.jpg
NIWNERR.METSTATION.jpg
NIWNERR.GAUGE.jpg

FINAL.DATA: (Directory Size: 723 KB, 2 subdirectories)

FINAL.YEARLY.DATA: (Directory Size: 605 KB, 48 files)

RAINDAZE.1978.DAYEVENT.xls
RAINDAZE.1978.DAYEVENT.csv
RAINDAZE.1979.DAYEVENT.xls
RAINDAZE.1979.DAYEVENT.csv
RAINDAZE.1980.DAYEVENT.xls
RAINDAZE.1980.DAYEVENT.csv
RAINDAZE.1981.DAYEVENT.xls
RAINDAZE.1981.DAYEVENT.csv
RAINDAZE.1982.DAYEVENT.xls
RAINDAZE.1982.DAYEVENT.csv
RAINDAZE.1983.DAYEVENT.xls
RAINDAZE.1983.DAYEVENT.csv
RAINDAZE.1984.DAYEVENT.xls

RAINDAZE.1984.DAYEVENT.csv
RAINDAZE.1985.EVENT.xls
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RAINDAZE.1988.EVENT.xls
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RAINDAZE.1996.EVENT.xls
RAINDAZE.1996.EVENT.csv
RAINDAZE.1997.DAYEVENT.xls
RAINDAZE.1997.DAYEVENT.csv
RAINDAZE.1998.DAYEVENT.xls
RAINDAZE.1998.DAYEVENT.csv
RAINDAZE.1999.DAYEVENT.xls
RAINDAZE.1999.DAYEVENT.csv
RAINDAZE.2000.DAYEVENT.xls
RAINDAZE.2000.DAYEVENT.csv
RAINDAZE.2001.DAYEVENT.xls
RAINDAZE.2001.DAYEVENT.csv

FINAL.SUMMARY.DATA: (Directory Size: 118 KB, 4 files)
RAINDAZE.1978-2001.MONTHSUMS.xls
RAINDAZE.1978-2001.MONTHSUMS.csv
RAINDAZE.1978-2001.YEARSUMS.xls
RAINDAZE.1978-2001.YEARSUMS.csv

FINAL.GRAPHICS: (Directory Size: 30.0 MB, 2 subdirectories)

FINAL.YEARLY.GRAPHICS: (Directory Size: 16.7 MB, 48 files)
1978.DAYEVENT.INCHES.JPG
1978.DAYEVENT.MM.JPG
1979.DAYEVENT.INCHES.JPG
1979.DAYEVENT.MM.JPG
1980.DAYEVENT.INCHES.JPG
1980.DAYEVENT.MM.JPG
1981.DAYEVENT.INCHES.JPG
1981.DAYEVENT.MM.JPG
1982.DAYEVENT.INCHES.JPG
1982.DAYEVENT.MM.JPG
1983.DAYEVENT.INCHES.JPG
1983.DAYEVENT.MM.JPG
1984.DAYEVENT.INCHES.JPG
1984.DAYEVENT.MM.JPG
1985.EVENT.INCHES.JPG

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1998.DAYEVENT.MM.JPG
1999.DAYEVENT.INCHES.JPG
1999.DAYEVENT.MM.JPG
2000.DAYEVENT.INCHES.JPG
2000.DAYEVENT.MM.JPG
2001.DAYEVENT.INCHES.JPG
2001.DAYEVENT.MM.JPG

FINAL.SUMMARY.GRAPHICS: (Directory Size: 14.4 MB, 50 files)

1978.MONTHSUM.INCHES.JPG
1978.MONTHSUM.MM.JPG
1979.MONTHSUM.INCHES.JPG
1979.MONTHSUM.MM.JPG
1980.MONTHSUM.INCHES.JPG
1980.MONTHSUM.MM.JPG
1981.MONTHSUM.INCHES.JPG
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2000.MONTHSUM.INCHES.JPG
2000.MONTHSUM.MM.JPG
2001.MONTHSUM.INCHES.JPG
2001.MONTHSUM.MM.JPG
1978.2001.YEARSUM.INCHES.JPG
1978.2001.YEARSUM.MM.JPG

6.3 Distribution Liability:
According to the Belle W. Baruch Institute for Marine Biology and Coastal Research:

> The datasets are only as good as the quality assurance and quality control procedures outlined in the Metadata. The user bears all responsibility for its subsequent use in any further analyses or comparisons. No warranty expressed or implied is made regarding the accuracy or utility of any data collected, managed, or disseminated for general or scientific purposes by the Belle W. Baruch Institute for Marine Biology and Coastal Research. This disclaimer applies both to individual use of the data and aggregate use with other data. It is strongly required that these data be directly acquired from the Belle W. Baruch Institute for Marine Biology and Coastal Research and not indirectly through other sources which may have changed the data in some way. It is strongly recommended that careful attention be paid to the contents of the metadata file associated with these data. Neither the Belle W. Baruch Institute for Marine Biology and Coastal Research, nor the National Oceanic & Atmospheric Administration's Office of Ocean and Coastal Resource Management, Estuarine Reserves Division shall be held liable for the use and/or misuse of the data described and/or contained herein.

According to the Ocean and Coastal Resource Management Data Dissemination Policy for the NERRS System-wide Monitoring Program:

> The dataset enclosed within this package/transmission is only as good as the quality assurance/quality control procedures outlined by the enclosed metadata reporting statement. The user bears all responsibility for its subsequent use/misuse in any further analyses or comparisons. The Federal government does not assume liability to the Recipient or third persons, nor will the Federal government reimburse or indemnify the Recipient for its liability due to any losses resulting in any way from the use of this data.

6.4 Standard Order Process
6.4.2. Digital Form
6.4.2.1 Digital Transfer Information
6.4.2.1.1. Format Name: EXCEL (.XLS) or WORD (.DOC) format as well as .CSV or .TXT (text only) format.

6.4.2.1.2 Format Version Number: Microsoft Office Professional 2000
6.4.2.1.6 File Decompression Technique: No compression applied
6.4.2.2 Digital Transfer Option
6.4.2.2.1.1 Computer Contact Information
6.4.2.2.1.1.1 Network Address
6.4.2.2.1.1.1.1 Network Resource Name: http://links.baruch.sc.edu/data/
6.4.3 Fees: None
6.5 Custom Order Process:
If requesting Non-digital (Paper (hard copy) printout), a fee of $50 per hour (with a one-hour minimum) plus the cost of supplies will be imposed. As an offline option, CD-ROMs are available at the cost of $5.00 each. This fee pays for the CD, the creation of the CD, and mailing charges.

7. Metadata Reference Information
7.1 Metadata Date: 20030100
7.2 Metadata Review Date: 20030131
7.4 Metadata Contact:

10.2 Contact Organization Primary	
10.1.2 Contact Organization:	Univ. of South Carolina's Baruch Institute
10.1.1 Contact Person:	Ginger Ogburn-Matthews
10.3 Contact Position:	Research Data Manager & Analyst
10.4 Contact Address	
10.4.1 Address Type:	Mailing Address
10.4.2 Address:	USC Baruch Marine Field Lab
10.4.2 Address:	PO Box 1630
10.4.3 City:	Georgetown
10.4.4 State or Province:	South Carolina
10.4.5 Postal Code:	29440
10.4.6 Country:	USA
10.5 Contact Voice Telephone:	(843) 546 6219
10.7 Contact Facsimile Telephone:	(843) 546-1632
10.8 Contact Electronic Mail Address:	ginger@belle.baruch.sc.edu
10.9 Hours of Service:	8:30 am to 4:30 pm EST/EDT Mon.- Friday

7.5 Metadata Standard Name:
Content Standard for Digital Geospatial Metadata, Part 1: Biological Data Profile

7.6 Metadata Standard Version: FGDC-STD_001.1-1999